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मानक

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IS 2586 (1986): Bench Vices [PGD 6: Earth, Metal And Wood Working Hand Tools]



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“Knowledge is such a treasure which cannot be stolen”

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Indian Standard
SPECIFICATION FOR BENCH VICES
(*Second Revision*)
(Incorporating Amendment No. 1)

1. Scope — Covers the requirements for bench vices, also known as machinist's vices, for mounting on work tables, for general workshop use.

2. Types

- a) Fixed base bench vices, and
- b) Swivel base bench vices.

3. Dimensions

3.1 Dimensions for fixed base bench vices shall be as given in Table 1.

3.2 Dimensions for swivel base bench vices shall be as given in Table 2.

3.3 Tolerance — Dimensions for width of jaw shall have a tolerance of ± 2 percent. Other dimensions are nominal and are recommendatory only.

4. Materials — The materials for various components of vices shall be such as to meet the requirements laid down in **6** and **11**. Following are the recommended materials for various components:

<i>Component</i>	<i>Material</i>
Body, movable jaw and swivel baseplate	Grey cast iron conforming to minimum Grade FG 200 of IS : 210-1978 'Specification for grey iron castings (<i>third revision</i>)' or Steel casting conforming to Grade 3 of IS : 1030-1974 'Specification for steel castings for general engineering purposes (<i>second revision</i>)' or Steel flats conforming to IS : 226-1975 'Specification for structural steel (standard quality) (<i>fifth revision</i>)'
Jaw plates	Tool steel conforming to designation 55T8 of IS : 3749-1978 'Specification for tool and die steels for cold work (<i>first revision</i>)'
Screw spindle and handle	Steel conforming to designation Fe410 of IS : 1570 (Part 1)-1978. 'Specification for steel specified by tensile and/or yield properties (<i>first revision</i>)'
Spindle nut	Grey cast iron conforming to minimum grade FG 200 of IS : 210-1978 or phosphor bronze conforming to IS : 28-1975 'Specification for phosphor-bronze ingots and castings (<i>third revision</i>)'

5. Mass — Shall be as given below:

Nominal Size	Minimum Mass of Fixed Base Vice, kg		Minimum Mass of Swivel Base Vice, kg	
	Cast	Fabricated	Cast	Fabricated
50	3	—	—	—
60	4.5	—	—	—
75	7	3	9	4
100	15	6	18	8
125	20	10.5	26	13
150	25	15.5	32	18

Adopted 2 May 1986

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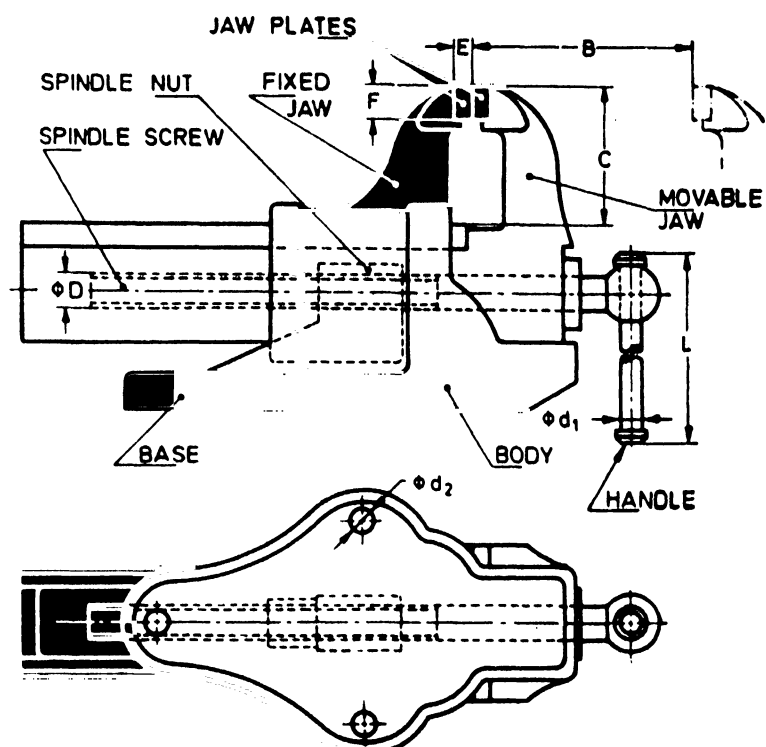
Price Group 3

BUREAU OF INDIAN STANDARDS
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TABLE 1 DIMENSIONS FOR FIXED BASE BENCH VICES

(Clause 3.1)

All dimensions in millimetres.



Nominal Size (Width of Jaw) A	B Min	C	D	E Min	F Min	L	d_1	d_2^*
50	50	38	Tr 12 × 3†	10	15	150	8	7
65	65	45	Tr 12 × 3†	10	15	150	8	7
75	110	65	Tr 20 × 4†	10	18	225	12	12
100	140	75	Tr 22 × 5†	11	21	250	14	14.5
125	175	85	Tr 28 × 5†	12	24	300	16	24
150	210	90	Tr 30 × 6†	12	29	350	18	24

*Clearance holes as per coarse series of IS : 1821-1982 'Dimensions for clearance holes for bolts and screws (second revision)'

†According to IS : 7008-1973 'Specification for ISO metric trapezoidal screw threads'

6. Hardness — The hardness of the jaw plates shall be 445 to 596 HV ($\approx$ 45 to 55 HRC).

7. Manufacture

7.1 Body — The fixed jaw and the base of the vice shall be soundly cast/fabricated to shape in one piece and the base shall have a flange or lugs to provide for at least three holes for mounting. The central mounting hole shall be on a line perpendicular to the fixed jaw and the other two holes parallel to the jaw equidistant from the central mounting hole. The holes in the jaw shall be accurately drilled and tapped.

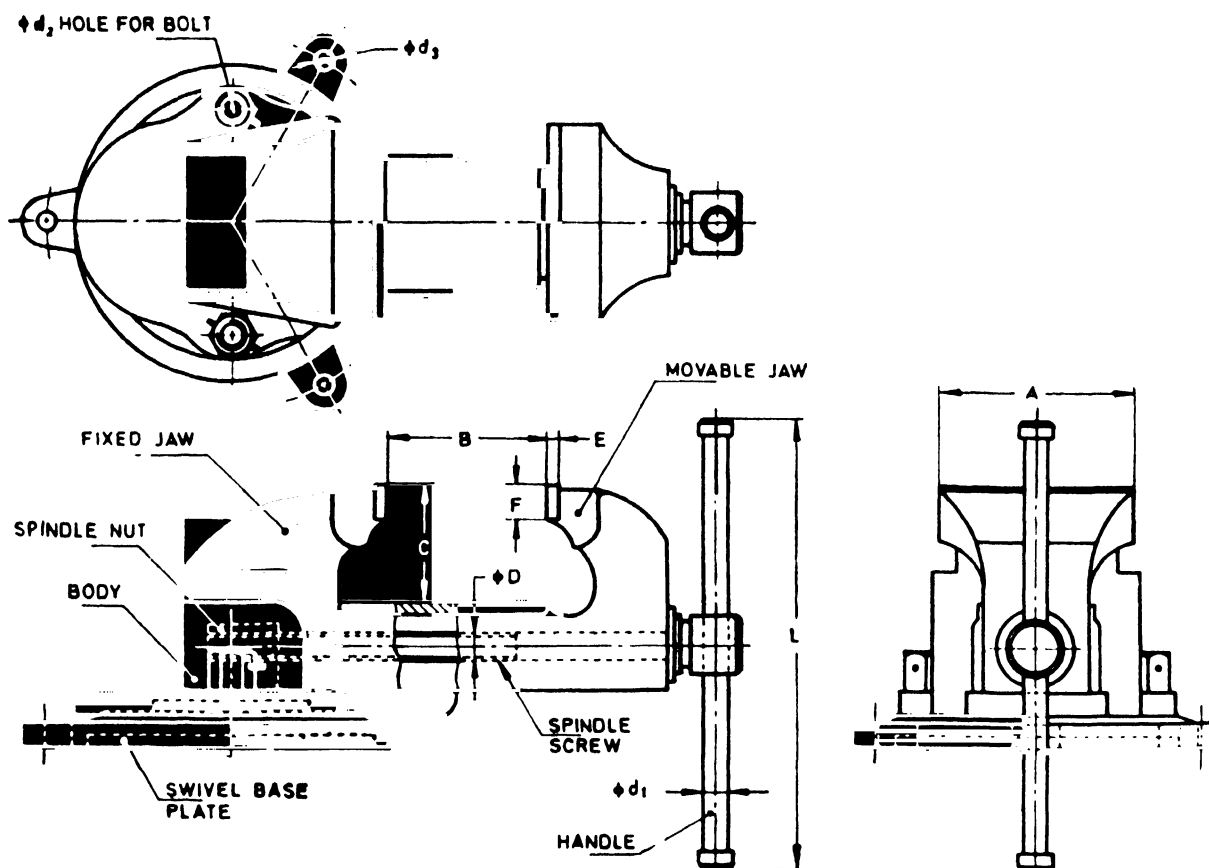
Note — Bolts and nuts conforming to IS : 1363-1967 'Specification for black hexagon bolts, nuts and lock nuts (dia 6 to 39 mm) and black hexagon screws (dia 6 to 24 mm) (first revision)' may be employed for mounting the vices on the work benches

7.2 Movable Jaw — The movable jaw shall be soundly cast/fabricated to shape and shall be so designed that the vice is statically balanced, that is, it should be possible for a worker to perform satisfactorily light jobs even when the vice is not fixed with bolts. The holes in the jaw shall be accurately drilled, countersunk and tapped to ensure a flush fixing of screws.

TABLE 2 DIMENSIONS FOR SWIVEL-BASE BENCH VICES

(Clause 3.2)

All dimensions in millimetres.



Nominal Size (Width of Jaw) A	B Min	C	D	E Min	F Min	L	d_1	d_2^* and d_3^*
75	80	60	Tr 20 × 4†	10	18	225	12	12
100	120	75	Tr 22 × 5†	11	21	250	14	14.5
125	150	85	Tr 28 × 5†	12	24	300	16	24
150	190	90	Tr 30 × 6†	12	29	350	18	24

*Clearance holes as per coarse series of IS : 1821-1982.

†According to IS : 7008-1973.

7.3 Swivel-Base Plate — The swivel-base plate shall be of sound casting or fabricated separately and shall have a flange or lugs to provide for at least three holes for mountings located equidistant from each other. The vice when mounted on this plate, shall swivel through 360° and shall have a positive locking arrangement to secure the vice in any angular position.

7.4 Jaw Plates — The jaw plates shall be soundly made to shape and securely fastened to the jaws by means of countersunk screws. The jaw plates shall be properly serrated to give proper and adequate grip.

7.5 Screw Spindle — The screw spindle shall have trapezoidal threads which shall be properly and accurately cut. It shall be so designed that it does not come out of the nut at the maximum opening position of the jaws.

7.6 Spindle Nut — The spindle nut shall have a length of at least 2.5 times the nominal diameter of the screw spindle. The threads in the spindle nut shall be properly and accurately cut.

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7.7 Handle — The handle shall be straight and shall slide freely in the hole provided at the end of the screw spindle. It shall not slide out of the hole during use. The sharp corners shall be suitably rounded off.

8. Workmanship and Finish

8.1 The castings or fabricated components shall be sound, free from sand-holes, pits, blowholes, scabs and other imperfections. The unmachined portion shall be dressed smooth. All components shall be free from cracks, rust, seams, flaws and other defects. The screw spindle shall move freely in the spindle nut without any undue play or stiffness. The backlash while tightening or opening the vice jaws shall not exceed one-eighth ($1/8$) of the pitch of the screw.

8.2 If desired by the purchaser, the combination vice having pipe gripping jaws and anvil as shown in Fig. 1 may be supplied. Such vices will meet the requirements as given in this specification and pipe jaws shall meet its requirements given in IS : 2587-1975 'Specification for pipe vices (open sides type and fixed sides type) (first revision)'. The face of the anvil shall be machined or ground and hardened. The variations on the surface shall not exceed one millimetre. Hardness, measured at six points about 25 mm apart on the face of the anvil, shall not be less than 370 HV (≈ 38 HRC).

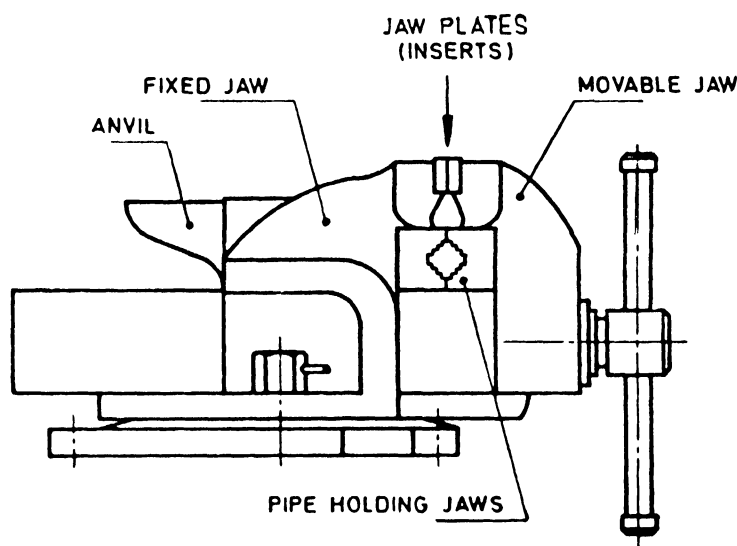


FIG. 1 COMBINATION VICE

8.3 If so desired by the purchaser, the vices shall be fitted with quick-release mechanism.

9. Designation — Bench vices shall be designated by its commonly used name, type of vice, that is, FB for fixed base and SB for swivel base vice, nominal size and number of the standard.

Example:

- a) A fixed base bench vice of nominal size 75 mm shall be designated as follows:

Bench Vice FB 75 IS : 2586

- b) A swivel base bench vice of nominal size 75 mm shall be designated as follows:

Bench Vice SB 75 IS : 2586

10. Sampling

10.1 For ascertaining the conformity of the lot with the requirements of this standard, the procedure for sampling inspection as given in IS : 2500 (Part 1)-1973 'Sampling inspection tables: Part 1 Inspection by attributes and by count of defects (first revision)', shall be followed.

10.2 For the requirements of this standard, a single sampling plan with inspection level IV and AQL of 1 percent as given in Tables 1 and 2 of IS : 2500 (Part 1)-1973 shall be followed.

11. Tests

11.1 Clamping Test — A turning moment as given below shall be applied to the screw spindle when the jaws are in closed position.

Nominal Size of the Vice (mm)	50	65	75	100	125	150
Turning Moment Nm	80	90	100	120	140	170

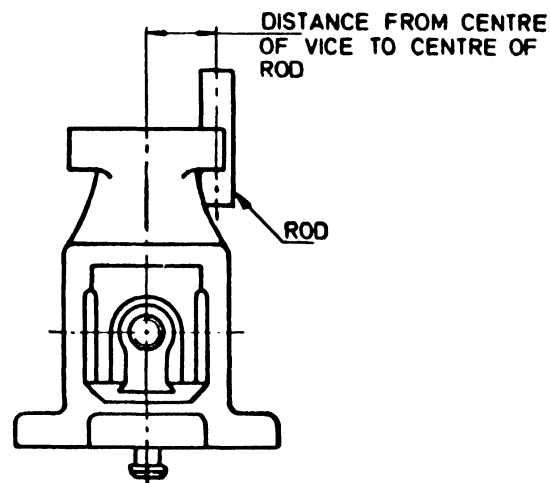
The vices shall not show any deformation or damage at the end of the test.

11.2 Slackness Test — The vice shall be fixed on the table and the jaw shall be opened to the extent indicated below:

Nominal Size of the Vice (mm)	50	65	75	100	125	150
Opening of Jaw (mm)	30	40	50	65	75	100

A load of 150 N ($\approx$ 15 kgf) shall be applied to the outermost end of movable jaw upwards or downwards, and to the left or to the right, the maximum displacement of the movable jaw shall not exceed 0.8 mm.

11.3 Eccentric Clamping Test — A mild steel rod of 50 mm diameter shall be clamped lightly in the position as shown in Fig. 2, and the position of the other end of the jaw determined. When a turning moment as specified in Table 3 is applied to the screw spindle, the displacement of the other end of the jaw shall not exceed the values specified in Table 3.



All dimensions in millimetres.

FIG. 2 ECCENTRIC CLAMPING TEST

TABLE 3 MAXIMUM DISPLACEMENT OF THE JAW FOR ECCENTRIC CLAMPING TEST

Nominal Size of the Vice	Distance from the Centre of the Vice to the Centre of Rod	Turning Moment to be Applied to the Screw Spindle	Maximum Permissible Displacement of the Jaw	
			In Horizontal Plane	In Vertical Plane
50	23	80	1.0	0.7
65	30	90	1.0	0.7
75	35	100	1.0	0.7
100	48	120	1.1	0.7
125	60	140	1.3	0.7
150	73	170	1.5	0.7

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11.4 Performance Test

11.4.1 *For bench vices 50 to 100 mm* — A mild steel bar of 12 mm diameter and approximately 150 mm long shall be gripped vertically in the jaws and given ten blows with a 1 kg hammer at right angle to the jaws, five on each side. The firmly held bar shall then be struck in a direction parallel to the jaw plates sufficient to move it in the vice. The jaw plates and the complete vice shall show no sign of damage, or distortion during or on completion of the test.

11.4.2 *For bench vices 125 to 150 mm* — A mild steel bar of 25 mm diameter and approximately 150 mm long shall be gripped vertically in the jaws at a distance of about 50 mm from one end of the jaws and given ten blows with a 1 kg hammer at right angles to the jaws, five on each side. The test shall be repeated after shifting the position of the mild steel bar further about 50 mm. The jaw plates and the vice shall show no sign of damage or distortion during or on completion of the test.

12. Preservative Treatment — The vices shall be painted on all non-working surfaces including the underside of the base. The working surfaces shall be covered with a rustproofing material.

13. Marking — The vices shall be marked with the nominal size and the manufacturer's name, initials or trade-mark.

13.1 Certification Marking — Details available with the Bureau of Indian Standards.

14. Packing — As agreed to between the purchaser and the manufacturer.

EXPLANATORY NOTE

Clamping devices of various types are required during assembly and other manual operations in an engineering workshop. The design of these devices depends upon the particular job for which they are required. Bench vices are one of such devices used in the workshops for holding the jobs.

This standard was first issued in 1964. The first revision of the same was taken up in 1975, in order to include the vices of nominal sizes 50 and 65 mm which are employed for light duty jobs.

This revision has been taken up in order to include the swivel base type bench vices in this standard. While revising, this standard has been modified to bring it in line with the modern manufacturing practices. Combination vices (with anvils and pipe gripping jaws) which are in demand have also been included.

The shape shown in the figures are only for illustration. The actual shape and other design details are left to the discretion of the manufacturers.

This edition 3.1 incorporates Amendment No. 1 (May 1998). Side bar indicates modification of the text as the result of incorporation of the amendment.

